

Appln No. 10/789,237
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Reply to Office action of May 13, 2005

REMARKS/ARGUMENTS

Claims 1-32 are now in the application. Claims 1, 9, 22, and 29 have been amended. Claims 30-32 have been added. The Applicants respectfully request reconsideration and allowance of the application in view of the amendment and the following remarks.

With respect to the specification, the Applicants have amended the paragraph on page 10, beginning at line 16, to correct a minor clerical error (i.e., adding "A" to "FIG. 5A").

The Examiner has rejected Claims 1-3, 5-9, 18-22, and 29 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,879,192 ("Merenda"). Claims 4, 12-16 and 24-28 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Merenda in view of U.S. Patent No. 5,416,449 ("Joshi"). Claim 10 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Merenda in view of U.S. Patent No. 5,239,685 ("Moe"). Claims 11 and 23 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Merenda. Claim 17 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Merenda and Joshi and further in view of U.S. Patent No. 5,339,284 ("Kaiser"). The Applicants respectfully traverse these rejections. Further, the Applicants have amended Claims 1, 9, 22, and 29 to better set forth the subject matter being claimed.

Specifically, the Applicants have amended Claim 1 to now recite a sub-harmonic mixer comprising:

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an input for receiving a first signal having a first frequency and a second signal having a second frequency;

an output for outputting a third signal having a third frequency; and

at least one diode ring array, each having a plurality of diode rings arranged in parallel, said diode rings having a diode,

wherein said diode comprises a field emission transistor (FET) or a high electron mobility transistor (HEMT), and

wherein said at least one diode ring array receives the first signal and the second signal, generates a fourth signal having twice the second frequency, and multiplies the fourth signal to the first signal to generate the third signal. (Emphasis in underline added.)

As such, the Applicants respectfully submit that Claim 1 is not anticipated by Merenda under 35 U.S.C. §102(e).

Merenda (whether alone or in combination with the other references made of record) does not disclose or suggest a diode that "comprises a field emission transistor (FET) or a high electron mobility transistor (HEMT)" as recited in amended Claim 1. By contrast, the present invention is directed to a novel sub-harmonic mixer having a diode ring array for reducing a parasitic or a second harmonic local oscillator (LO) leakage. The second harmonic LO leakage results because the diodes of the

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array include or are composed by FETs or HEMTs. As discussed in page 12, line 31 to page 13, line 15 of the specification, a FET or HEMT diode has "many unavoidable parasitics ... [resulting in] leakage power at the second harmonic of the LO" A sub-harmonic mixer of the present invention reduces an effect of the "unavoidable parasitics" because it comprises "at least one diode ring array, each having a plurality of diode rings arranged in parallel" as recited in Claim 1. This is also explained in page 13, lines 16-32 of the specification. By contrast, if a diode ring is made by a conventional diode (or a "real" diode, i.e., not from FET or HEMT), there is no description, suggestion, or teaching in Merenda that the above reduction would be needed.

As such, since Merenda (whether alone or in combination with the other references made of record) does not disclose or suggest a diode that "comprises a field emission transistor (FET) or a high electron mobility transistor (HEMT)," it certainly cannot disclose, suggest, or teach a diode ring array that reduces a parasitic by "having a plurality of diode rings arranged in parallel, said diode rings having a diode, wherein said diode comprises a field emission transistor (FET) or a high electron mobility transistor (HEMT)" as recited in Claim 1.

Accordingly, the Applicants respectfully submit that Claim 1 is not anticipated by Merenda under 35 U.S.C. §102(b). See *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F. 2d 1573, 1576 (Fed. Cir. 1991) ("There must be no difference between the claimed invention and the reference disclosed, as

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viewed by a person of ordinary skill in the field of the invention").

Amended independent Claim 9 should also be allowable for at least the reasons that Merenda (whether alone or in combination with the other references made of record) does not disclose, suggest, or teach a transmitter comprising, among other things:

a sub-harmonic mixer having at least one diode ring array, each having a plurality of diode rings arranged in parallel, said diode rings having a diode, the sub-harmonic mixer receiving an intermediate frequency (IF) signal and translating the IF signal to a transmission signal having a transmission frequency; and

* * *

wherein said diode comprises a field emission transistor (FET) or a high electron mobility transistor (HEMT) (Emphasis in underline added.)

In addition, amended independent Claim 22 should be allowable for at least the reasons that Merenda (whether alone or in combination with the other references made of record) does not disclose, suggest, or teach a method of generating a transmission signal having a transmission frequency from an intermediate frequency (IF) signal, comprising:

generating a local oscillator (LO) frequency
signal having an LO frequency;

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generating a signal having twice the LO frequency using a sub-harmonic mixer including at least one diode ring array, each having a plurality of diode rings arranged in parallel, said diode rings having a diode comprising a field emission transistor (FET) or a high electron mobility transistor (HEMT); and

multiplying the signal having twice the LO frequency to the IF signal using the sub-harmonic mixer to generate the transmission signal. (Emphasis in underline added.)

Similarly, amended independent Claim 29 should also be allowable for at least the reasons that Merenda (whether alone or in combination with the other references made of record) does not disclose, suggest, or teach a receiver comprising, among other things:

a sub-harmonic mixer having at least one diode ring array, each having a plurality of diode rings arranged in parallel, said diode rings having a diode, the sub-harmonic mixer receiving a transmission signal having a transmission frequency and translating the transmission signal to an intermediate frequency (IF) signal; and

* * *

wherein said diode comprises a field emission transistor (FET) or a high electron mobility transistor (HEMT)

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Claims 2-8 depend (directly or indirectly) from Claim 1; Claims 10-21 depend (directly or indirectly) from Claim 9; and Claims 23-28 depend from Claim 22. As such, these dependent claims incorporate all the terms and limitations of their respective base claims in addition to other limitations, which together further patentably distinguish them over the references made of record. Therefore, these claims should also now be allowed.

Accordingly, the Applicants submit that a *prima facie* case of anticipation has not been established because Marenda does not disclose each and every limitation of the present claims. See MPEP § 2131 and see also *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F. 2d 1573, 1576 (Fed. Cir. 1991) (i.e., there must be no difference between the claimed invention and the reference disclosed).


Further, a *prima facie* case of obviousness has not been established for dependent Claims 4, 10, 11-17, and 23-28 because Marenda alone or combined with Joshi, Moe, and/or Kaiser does not disclose each and every limitation of these dependent claims. See MPEP § 2143.03 ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.")

New Claims 30-32 have been added. Claims 30 and 31 depend (directly or indirectly) from Claim 1 and Claim 32 depends from Claim 9. It is respectfully submitted that the limitations in these new claims are neither disclosed in nor suggested by Merenda, Joshi, Moe, and/or Kaiser.

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In view of the foregoing, the Applicants respectfully submit that Claims 1-32 are in condition for allowance. Reconsideration and withdrawal of the rejection is respectfully requested, and a timely Notice of Allowability is solicited. If there are any remaining issues that can be addressed over the telephone, the Examiner is encouraged to call Applicants' attorney at the number listed below.

Respectfully submitted,
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